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VIBES

Courtesy: Dr.Sutanu Roy

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Director's Desk

Dear Colleagues,

It is heartening to hear the news that 2nd issue of the NISER Newsletter Vibes is all set to come out. It gives me immense pleasure to note that neonatal risks and other environmental hazards did not become a deterrent to bring out the current issue of VIBES. NISER newsletter is purely online and available to the entire NISER family including its continually growing alumni. In fact, the current newsletter, as an effort of the section dealing with International Affairs and Resource Planning (IARP) NISER, keeps the focus to keep in constant touch with its alumni and to inform the progress@NISER and also to know about their progress and achievements. Although NISER being a new institute of around a decade old, it only produced a handful of batches and perhaps it would take another 5 years to reach a critical strength for its alumni fraternity. I sincerely thank, The Dean, IARP, Dr. Palok Aich and Dr. Joe Varghese Yeldho and other members involved to spearhead the efforts and to keep it alive to reach our Alumni and to keep us all appraised of the news from NISER. For example, we have increased our UG student intake and seats for accommodating 170 students has been arranged for this year. Our faculty members are continuing to attract laurels of highest order (for details please see below). Our two newly formed schools: school of computer sciences and school of earth and planetary sciences are thriving to become part of the mainstream. We are seeing that individually some faculties are putting their efforts to show our students the alternate paths for career such as in the areas of science communication, innovation and entrepreneurship. I would hope our Alumni would continue to remain in contact with its alma mater to see that NISER attains its top. I welcome NISER alumni to keep us appraised of their success and growth, so that we can include them in the Newsletter for better dissemination. They should exchange their thoughts and share their experience when visiting NISER next time. I also encourage all sections of NISER to cooperate with the IARP team to keep it alive and to make VIBES a vibrant and colourful communication of NISER.

Director, NISER

AWARDS

Prof. Sudhakar Panda

Prof. Bedangadas Mohanty

Prof. Sudhakar Panda and Prof. Bedangadas Mohanty, Physicists both, were awarded the Prestigious J.C. Bose fellowship. The award is a recognition of their long standing commitment to the advancement of the frontiers of our knowledge of physical phenomena. The award entails a fellowship amount of ₹25,000/- every month and an annual grant of ₹15 lakh. The award grant duration while initially for a period of 5 years is extendable by a similar period following a review process.

Summer Outreach Program in Mathematics (SOPM) 2017

School of Mathematical Sciences organised Summer Outreach Program in Mathematics during June 19 - July 1, 2017. A total number of 31 master students having less exposure to Mathematics from various colleges and universities participated. There were three short courses on Algebra, Analysis and Geometry during the program. Professor S. M. Srivastava from Indian Statistical Institute, Kolkata delivered some special lectures. The Outreach Program gives unique opportunity to students from remote places to interact with faculty members and to think about pursuing a carrier in Mathematics.

Training Program in Mathematics (TPM) 2017

-A nanoscopic attempt to strengthen mathematics education in India

The Training Program in Mathematics (TPM) conducted this summer in NISER from May 22 to June 17, 2017 saw excellent participation. This was the third edition in the TPM series. It is a month long program which trains around 180 students with the help of 24 faculty drawn from NISER and other Institutes of repute such as IIT, IISER, HRI, TIFR and Universities. The main objective of TPM is to promote independent learning among students. It aims to provide a solid foundation in mastering the "art of doing mathematics." This is achieved by encouraging students to arrive at mathematical concepts on their own.

The process of selection of students starts from the month of October. Posters are sent to all colleges, Universities, and Institutes, showcasing the program. This year there were around 1200 students who applied online from various institutes across the country ranging from Kashmir to Kanyakumari. The programs is organized each year under the auspices of the Centre For Fundamental Studies (CFS) at NISER, which has a mandate to help in the propagation of science in the eastern region of India. (Visit http://cfs.niser.ac.in for further details).

Mathematics is not a careful march down a well-cleared highway, but a journey into a strange wilderness, where the explorers often get lost.

Rigour should be a signal to the historian that the maps have been made, and the real explorers have gone elsewhere. -- W. S. Anglin

Science, Technology and Society

School of Humanities and Social Sciences (SHSS) at NISER hosted the national Conference on "Science, Technology and Society" and the Research Committee meeting of the Indian Sociological Society (ISS). The primary objective of the national seminar was to enable systematic and cross-disciplinary discussions related to science, technology, and society.

The two-day long seminar included presentations and discussions on issues in scientific and technological development and its relation to society. The seminar facilitated interdisciplinary conversations on contemporary issues in Science and Technology in contexts that are socially relevant. The seminar kicked off on 22nd July with a modest inaugural session chaired by Prof. Sujata Patel, the President of the Indian Sociological Society. Dr. Ambika Prasand Nanda, the CSR Head of TATA Steel was the Chief Guest of the occasion. Prof. Paramjit Singh Judge, the Managing Editor of Sociological Bulletin graced the inaugural session as the Guest of Honour. Prof. Sudhakar Panda, Officiating Diretor of NISER delivered the welcome address emphasizing the need for uninterrupted efforts to foster Society- Science Interface and creating socially relevant scientific knowledge. Dr. Pranay Swain, the Chairperson of the School of HSS was the Organising Secretary for the seminar. The Inaugural session was followed by the plenary talk by Prof. Bedangadas Mohanty of NISER who narrated a panoramic view of the Social Landscape from a Physicist's point of view. The technical sessions were driven by many eminent Social Scientists from various reputed Universities and Institutes such as; IIM Calcutta, IIT Kanpur, IIT Guwahati, TISS Mumbai, Central University of Gujrat and North Bihar, Lucknow University, Calcutta University, Central University of Allahabad, and University of Hyderabad. Prof. E Haribabu, former Dean and VC of University of Hyderabad delivered the valedictory address on 23 July 2017. On the side-lines of the seminar, SHSS also hosted the annual meeting of the Research Conveners and Management Committee of the Indian Sociological Society.

J-holomorphic curves and Gromov-Witten invariants

This has been a very exciting area of research at the interface of both Mathematics and Physics for the last twenty years. The subject has its origins in classical questions of enumerative geometry (counting certain objects) that were investigated more than hundred years ago. In the last twenty years the subject was revolutionized by Gromov's seminal work on J-holomorphic curves. Further- more, deep insights have been brought into this subject from Physics particularly from Witten's study of non-linear sigma models.

This workshop attracted the interest of plenty of enthusiastic students and postdocs (working in diverse areas such as Differential Geometry, (Complex) Algebraic Geometry, Algebraic Topology and Theoretical Physics). We held a two week long workshop starting with the very basics and then moving on to more advanced material. We brought together several young mathematicians in India who work in different aspects of this subject to give lectures, discuss mathematics and exchange ideas. We are also going to have a follow up discussion meeting in ICTS Bangalore, where international experts in this area will deliver lectures and expose us to the forefront of mathematical research.

We believe the workshop at NISER (and the subsequent discussion meeting at ICTS) will be hugely beneficial to those who are interested in pursuing this area of mathematics.

Science Communication:

While science is important to understand nature and to make our living better it is more important to make people understand the value of Science. To make people aware of potentials of science is through proper communication. What is Science, what is its value, how is it done, what scientists do and why do they do it and many more questions must roam around in the minds of people. Onus is on us to make people understand and get clarified on all these issues. Moreover, Scientists do what they do using the tax payers or people's money. Therefore, it is our moral obligation to ensure that work is disseminated appropriately and regularly to them. It is also important that senior scientists make an effort to make the juniors understand the value and need of science communication. With this goal, Dr.Palok Aich of School of Biological Sciences (SBS), NISER initiated an effort to train some interested young minds of NISER in science communication. He started with biology

students and after a couple months of training around 20 biology students (PhD candidates and UG, Integrated MSc students) presented two short (around 15 minutes) programmes on science communication on topics (a) pasteurization and (b) Biological Evolution on April 7, 2017. Session was officially inaugurated by Professor V. Chandrasekhar,

the then Director, NISER. Program is continuing and newer students are interested in participating.

Odisha Health Consortium, Bhubaneswar:

One of the major areas of Biology is Health Research. Health research without participation of clinicians is like a toast without butter. Dr. Palok Aich spearheaded an initiative to form a consortium at national and local level. On May 17, they had a first meeting with 5 clinicians (from AIIMS, BBSR; SCB medical College, Cuttack; KIIMS, BBSR; Sum Hospital, BBSR) and 5 basic researchers (from NISER, ILS and KIIT). In the first meeting they identified 4 topics (major health problem) of interest to go ahead, these are Peptic Ulcer Disease (PUD), Lean Non-Alcoholic Fatty Liver Disease (NAFLD), Systemic Lupus Erythematosas (SLE) and Diabetic Foot Disease.

On the meeting of June 17, 2017 they decided to submit a funding proposal on PUD and NAFLD, as this is not only prevalent locally and in India, it is also a major health issue globally. They wanted to understand etiology of the diseases, understand the mechanism and connectivity of various stages of both diseases and a long term plan is to find an intrinsic solution to the health problem.

Bhubaneswar Bio-cluster:

Biology research of Bhubaneswar have also started a cluster formation among local universities and research institutes to build joint research programs and central research facility.

Entrepreneurship Workshop:

Since, many of our students are getting inclined to innovation and start-ups, Dr. Palok Aich began an effort to plan workshops by the leading industrialist at NISER. The first one was organised on Aug 12-13, 2017 by Dr. Sriram Srinivasa Raghavan, VP, Evolva Bioscience and CEO of 2 start-up biotech industries. This event was preceded by a popular talk on innovation by Dr. Satyaprakash Dash of DBT-BIRAC, GOI, on Aug 06, 2017.

OTHER EVENTS

Independence Day Celebration

Plantation Programme on Independence Day

Date: August 15, 2017

Independence Day was celebrated this year with great fervour and excitement. Prof. Sudhakar Panda, Director, NISER hoisted the National Flag, following which there was a cultural show organised by the students. The hallmark of the event was large scale participation by the campus community in planting saplings around campus.

Third International Yoga Day

Yoga integrates body, mind, intellect and soul of an individual and ensures better physical and mental health. The benefits of Yoga have been realized by people across the globe. As a reflection of this, the United Nations announced June 21 as International Yoga Day (IYD). Thus Yoga has now united people across the globe.

Like the past years, this year third IYD was celebrated at the Yoga Centre of NISER at the hill top. About 25 students, staff and faculty members participated in the yoga practice led by Dr Amarendra Das, Assistant Professor, School of Humanities and Social Sciences who has also been appointed as the Yoga Coordinator of NISER. Prior to the IYD celebration, three day long yoga training programme was conducted in the Yoga Hall of NISER located in the Students Activity Area. Shree Ravi Naidu, Prant Sangathak, Odisha Prant of Vivekanand Kendra, Kayakumari was invited by NISER community members. Around 30 people participated in this Yoga training programme. Since last two years a group of faculty members, students and staff have been participating Yoga on regular basis in the campus.

NEST 2017: REPORT

NEST, the nation-wide test that NISER and CEBS, Mumbai jointly conduct for intake of students into the flagship integrated MSc programmes of these institutions, has been conducted on 27th May this year in 123 venues of 59 cities across country. In a short span of over a decade NEST has become one of the most popular entrance tests of the country in the area of basic sciences. With 68544 applicants this year, the application to seat ratio is an emphatic 313 applicants for every single seat. This year, special efforts were made to further popularise NEST in the north-east corners of the country by individually reaching out to more than 500 schools in the seven north-eastern states. Among the 46969 candidates who appeared for the exam, more than 8000 candidate appeared from Bhubaneswar alone. As expected, Odisha registered maximum participation with more than 16000 applicants appearing for the test in seven major cities of Odisha. The resultwas declared on the NEST website on 16th June with 2523 candidates qualifying for admission to the programme.The success rate of 5 out of every 100 appearing candidates makes NEST as one of the toughest entrance test of the country. On 7th July 169 candidates took admission to NISER. Another 46 took admission to CEBS, Mumbai. The academic session of the current batch at NISER began on 28th July.

CHANGE AT THE HELM: DIRECTORATE

Prof. V. Chandrasekhar left in early June to take charge of TIFR Hyderabad campus. Prof. Sudhakar Panda has assumed charge as the new director, NISER. He joins us from IOP, Bhubaneswar, where he continues to hold charge as Director.

FINANCE OFFICER RETIRES

Mr. Y. K Srinath retired from the position of Finance Officer on July 31. He had been associated with NISER from its inception and was a significant presence in securing the financial health of the project. He had a long stint of 39 years on the job and was a part of several DAE constituents during this long innings. He retires with his family to the city of Hyderabad. The Institute takes great pleasure in wishing him well.

STUDENT ACTIVITIES @ NISER

Prom Night:

This one we borrowed from the Western culture and features every year as a part of student activities. This was organised by batch-15 on 16th April 2016 in the Student Activity centre.

Farewell:

The 2016-17 academic session closed in with the graduation of another Integrated MSc Batch. The 2012 batch completed their 5 year journey in NISER. And as the tradition goes the junior batch organised farewell parties for the outgoing batch. Departmental farewells were organised followed by a general farewell. Goodbyes aren't easy and the farewells were a testimony to the fact. All we could see was a sense of accomplishment as well as a heart full of grief.

Cultural Night:

To mark the end of the academic session we organised a cultural night on 15th April 2017. Various participants performed in the open air auditorium.

ArC Club and LitC Club:

Letters have become obsolete for very practical reasons. And the practice has become archaic which on the bright side gives it a very present 'nostalgic value'. The dopamine rush we are accustomed to, associating to the 'beep' on our Facebook notification is minuscule compared to the one you would experience on receiving a letter. So ArC and LitC took up a collaborative initiative to help NISERites experience this rush. There's no substitute for a letter to communicate the intimacy other than physical presence. Participants could just draw a doodle or write up a letter to whomsoever (can be your roomie or a distant blotted out friend) they wished and drop a reply.

RESEARCH ACTIVITY @ NISER: GLIMPSES

Dr. Colin Benjamin and group work on Theoretical nanoscience, quantum information and game theory @SPS, NISER.

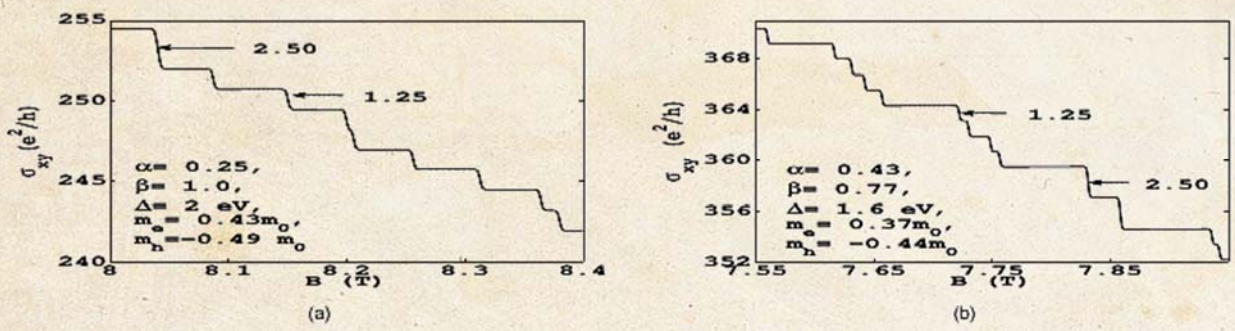

Figure 1. Hall conductivity versus magnetic field (in Tesla) for different values of topological parameters- α and β, see paper for how these parameters arise. Here, Δ is the direct band gap. m_e and m_h are effective electron and hole mass, respectively in MoS_2.

i) The work on Topologically induced fractional Hall steps in the integer quantum Hall regime of MoS2, SkFiroz Islam and Colin Benjamin, Nanotechnology 27, 385203 (2016) was featured in the Nanotechweb.org website, Can fractional steps appear in the integer quantum Hall regime?, Nanotechweb.org LAB TALK Sep. 26, 2016, see http://nanotechweb.org/cws/article/lab/66357.

ii) Awarded in 2016 from DST SERB, Project title: Non-local correlations in nanoscale systems: Role of decoherence, interactions, disorder and pairing symmetry, Time: 3 years, Manpower: One Research Associate, Amount: 25 Lakhs. Host: NISER.

iii) Awarded DAAD Research stay MAY-JULY 2016, Host: Institute of Quantum Information, Aachen, Germany.

iv) DST Nanomission in its March 2017 review rated the progress in the project DST Nanomission project (PH1304) "Topology, spintronics and quantum computation with Dirac materials" as **Very Good**.

DAY CARE CENTRE

Women who are also parents are constrained by the dual responsibility of childcare and work. A day care centre for children of working parents is a must to strengthen women equality. We requested for such a facility within NISER campus, and it was finally approved by our former director Prof. V. Chandrashekar. A committee consisting of Dr. Sumedha, Dr. Manjusha Dixit, Dr. Srinivas Ramanujan, Dr. Renjith Mathew, Dr. Venkasubbaiah Krishanan and Dr. Pranay Swain was constituted. The committee decided on a location, furnishing and safety measures and made the facility a reality this year in May 2017. It was inaugurated by the director, Prof. V. Chandrashekar on 01st May 2017.

INTERNSHIP PROGRAMMES

International project student:

David Datzkiw, an international student, from, University of Winnipeg, Canada spent 6 months in the laboratory of PalokAich of SBS, NISER. David was a recipient of Queen Elizabeth Scholarship and visited NISER as Queen Elizabeth Scholar (QES). During his visit, he mainly worked on a project related to probiotic and adipogenesis and as a QES fellow, he was also allowed to learn diversity of Indian culture and made a few small trips around certain areas of India like Kerala and West Bengal besides visiting local sites in Odisha. He also made his debut in scientific publication from Aich's group at NISER. A figure from his first publication also could made a place in the cover page of the journal. A link for his first paper can be found at http://press.mu-varna.bg/ojs/index.php/bmr/article/view/2108. Overall his experience was great as can be seen by exploring the link http://www.uwinnipeg.ca/graduate-studies/features/bioscience-student-david-datzkiw-on-research-and-being-a-qe-scholar.html.

The Khorana Program

The Department of Biotechnology (DBT), Govt. of India, Indo-US Science and Technology Forum (IUSSTF) and WINStep Forward are partnering to support the prestigious Khorana Program for Scholars named in honour of Dr. Har Gobind Khorana, who won the Nobel Prize in 1968 for his work at the interface of Chemistry and Biology while a member of the UW faculty. The Khorana Program will provide opportunities to Indian students to undertake research at University of Wisconsin-Madison (UW) and partner universities in summer 2018 for a period of 10 weeks.

AindrilaSaha, currently a 4th Year Integrated MSc student from the School of Biological Sciences attended the summer school in the University of Wisconsin, Madison under Dr. Baron Chand. She went to the university under the Khorana program.

MITACS

The Mitacs Globalink Research Internship is a competitive initiative for international undergraduates from Australia, Brazil, China, France, India, Germany, Mexico, Saudi Arabia, Tunisia, and Ukraine. From May to September of each year, top-ranked applicants participate in a 12-week research internship under the supervision of Canadian university faculty members in a variety of academic disciplines, from science, engineering and mathematics to the humanities and social sciences.

BiprateepDey, currently in 5th Year of Integrated MSc from the School of Physical Sciences interned at the Department of Physics of the University of Alberta, Edmonton. He worked with Prof. Erik Rosolowsky of the Astrophysics research group of the department.

VSRP

Tata Institute of Fundamental Research (TIFR) conducts annual summer programmes in which talented students are introduced to research activities in the areas of Astronomy, Biology, Chemistry, Computer Science, Mathematics, and Physics.

Diptanil Roy, currently a 4th Year Integrated MSc student from the School of Physical Sciences attended summer school in TIFR as a part of the Visiting Students Research Program.

IAS

ShubhashreePani, currently in the 3rd Year Integrated MSc from the School of Chemical Sciences got through Indian Academy of Sciences and worked under Prof. Subrata Ghosh at Indian Association for the Cultivation of Science, Kolkata.

Ganesh Parida, currently a 4th Year Integrated MSc student from the School of Physical Sciences got through Indian Academy of Sciences and worked under Dr.VikramTripathi, Department of Theoretical Physics, TIFR, Mumbai.

NIUS

The National Initiative on Undergraduate Science (NIUS), a major initiative of HBCSE (TIFR) concerning tertiary science education in India, was launched in the summer of 2004. With thrust on promoting undergraduate research and learning, the NIUS programme has been contributing towards training of students and teachers in theoretical and experimental science, preparation of pedagogical material and R&D in science education/laboratory training.

Ankita Priyadarshini, currently in the 3rd Year Integrated MSc from the School of Biological Sciences worked under Prof. Dr. B. B. Nath, S.P.Pune University at HBCSE, Mumbai through the NIUS, Biology programme.

Arpit Kumar Pradhan, currently a 4th Year Integrated MSc student from the School of Biological Sciences was selected as a NIUS fellow in chemistry.

The Kupcinet-Getz International Science School

The Kupcinet-Getz International Science School accepts a select number of outstanding undergraduate students each summer to participate in research projects in mathematics, physics, chemistry and the life sciences. This is an enrichment program designed for undergraduate students from all over the world who are majoring in the sciences, and it is an opportunity to experience science by becoming part of a research group at the Weizmann Institute.

Vyshnavi Manoj Kumar, currently in 5th Year of Integrated MSc from the School of Chemical Sciences went to the Weizmann Institute as an intern through the Kupcinet-Getz International Science School program and worked under Prof. Daniella Goldfrab.

IISER Pune Summer Student Programme – 2017

Prajnanandan Giri, currently in the 3rd Year of Integrated MSc from the School of Chemical Sciences interned at IISER pune under Dr. S.G. Srivtasan.

Visiting Students Program (VSP) of IUCAA

Abhishek Das, currently a 4thYear Integrated MSc student from the School of Physical Sciences attended summer school in IUCAA under Prof. Sukanta Bose.

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